

Engine OFF Hydraulic Fluid / Engine Coolant / Cab Warmer

Caterpillar 980K

INSTALLATION MANUAL



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1. INTRODUCTION

1.1. Scope

These non-binding installation instructions are intended to support authorized Webasto trained distributors, dealers and personnel in the installation of the Webasto Thermo 90ST Series heater. Provided these instructions are followed properly and all options are installed listed in the parts breakdown, this system will provide Engine OFF Hydraulic Fluid, Engine Coolant, and Cab Heating.

1.2. Applicability of Manual

These non-binding installation instructions apply to the make / model machine listed on the front cover of this installation manual. Technical modifications that differ from the instructions set forth exclude all liability claims. Acknowledged engineering conventions must be observed for the installation work. Additional information is contained in the heater installation manual in your kit. Carefully read all documentation prior to installation.

CAUTION

Location of the Webasto provided components, wiring and control devices are important for proper operation. Failure to comply with the installation instructions provided may result in poor operation or damage to the heater, machine, or machine components.

Non-compliance with the installation instructions and information contained therein will void warranty. The same applies for repairs performed by untrained personnel and repairs not using original equipment spare parts.

1.3. Meaning of Warnings, Cautions and Notes

WARNING

This heading is used to highlight that non-compliance with instructions or procedures may cause injuries or lethal accidents to personnel.

CAUTION

This heading is used to highlight that non-compliance with instructions or procedures may cause damage to equipment.

NOTE

This heading is used to highlight and draw specific attention to information.

1.4. Safety

All relevant state and provincial regulations if any, governing the installation and use of non-idling devices must be observed! The general safety regulations for the prevention of accidents and the relevant operating safety instructions must be observed at all times.

1.5. Legal Provisions for Installation

Machine operation must not be impaired due to any Webasto installed components. All power circuits must be fused with appropriate fuse or circuit breaker.

2. PARTS LIST

Machine

Make	Model
Caterpillar	980K

Included in Box

Item	Product #	Description	Source	Qty.
1	5010808A	Thermo 90ST Off Hwy HD Kit 24V Diesel	Webasto	1

Optional Add-on Accessories

Hydraulic Heating				
Item	Product #	Description	Source	Qty.
1	H4000-16	Hydra Liner (Hydraulic Fluid Warmer)	Webasto	1
2	A-3228HD	Weld-on Adapter Coupler	Webasto	1
3	A-4324	90° Elbow 3/4" threaded male to 3/4" threaded female	Arctic Fox	1
4	5001210A	3/4" MNPT to 5/8" hose barb	Webasto	2
5	BCT010079A	Bracket Mounting Bolt - Zinc Plate M14 x 40 (8.8)	Webasto	2

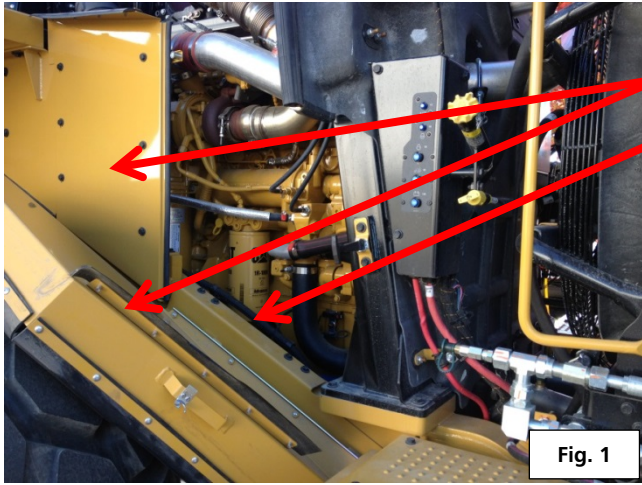
Interior Entry				
Item	Product #	Description	Source	Qty.
2	901201	Deutsch Socket (20-16 Gauge)	Webasto	4
3	901202	Deutsch Plug (20-16 Gauge)	Webasto	4
IMPORTANT Two terminal sources were provided to ensure availability. A total of 8 terminals are needed to perform the installation set forth in this manual.				
8	0462-201-16141	Deutsch Socket (20-16 Gauge)	Deutsch	4
9	0460-202-16141	Deutsch Plug (20-16 Gauge)	Deutsch	4

Optional Terminal Tools				
Item	Product #	Description	Source	Qty.
1	0411-291-1405	Deutsch Terminal Removal Tool (Optional)	Deutsch	1
2	HDT-48-00	Deutsch Terminal Crimping Tool (Optional)	Deutsch	1

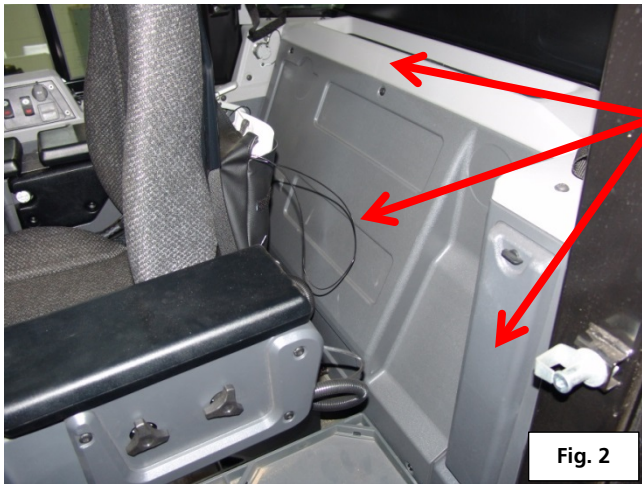
3. PREPARATION

- Verify and identify all contents of kit.

3.1. Heater Preparation



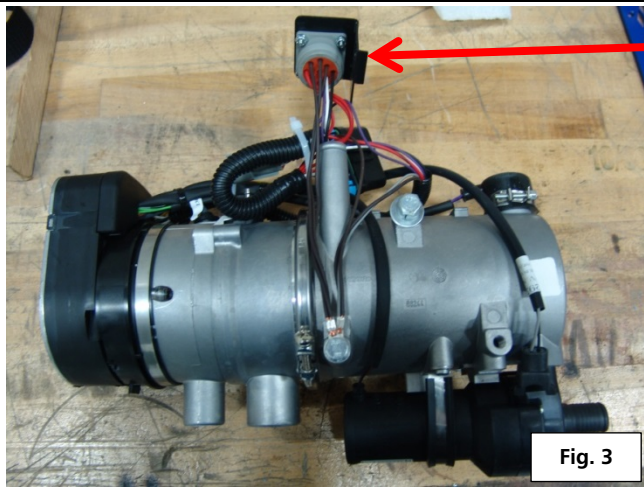
Remove Access Door and side panel.
Heater Mounting Location (Left side of machine)



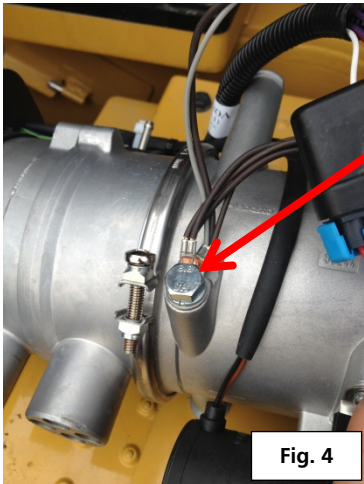
Obtain fuse box access by removing interior panels shown.



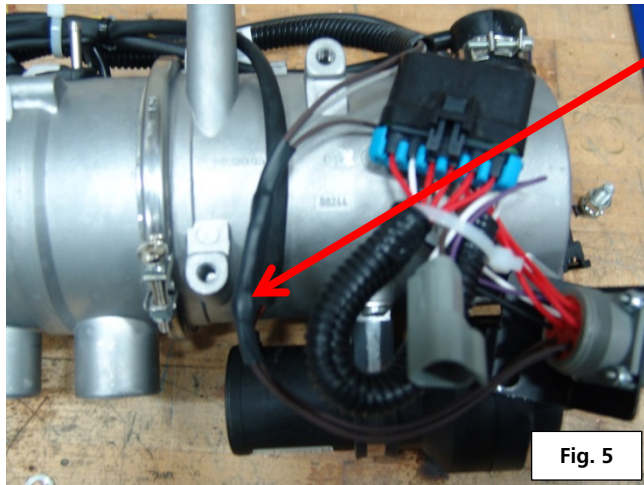
IMPORTANT
The CAT 980K Series is designed with a negative (Ground) master disconnect switch. The proceeding steps will describe a necessary Webasto harness ground modification required for this installation.



Remove the heater electrical connector from its current mounting location. This will be relocated in proceeding steps.



Remove ground portion of the harness from the location shown.



Reconfigure all heater harness ground leads into one spliced ground circuit. Harness will no longer be grounded to the heater or machine chassis.

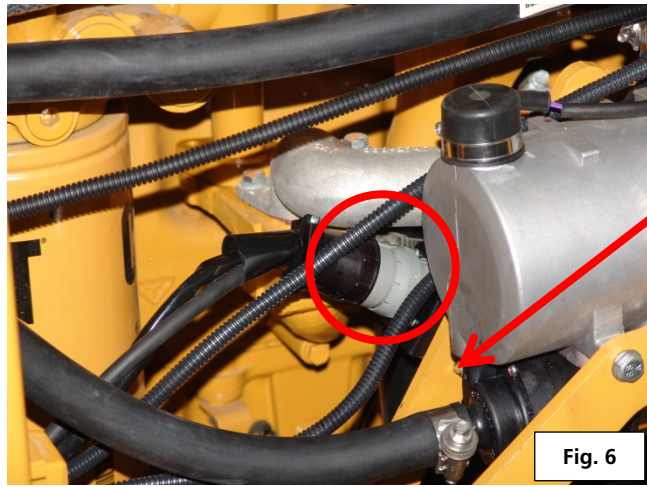


Fig. 6

During the heater dry fit mounting process; mark and drill a new hole to mount the electrical connector bracket facing the front of the machine.

Rear heater mounting bracket.

3.2. Hydra Liner Preparation

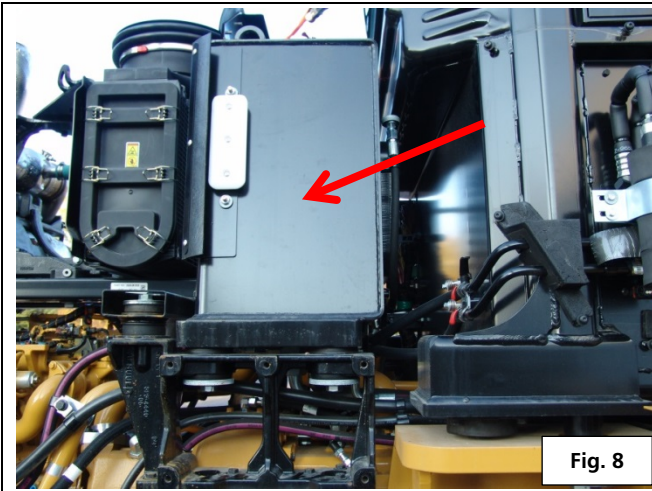


Fig. 7

Drain the hydraulic tank per the manufacturer's recommendations.

NOTE

This section is only necessary when installing a Hydra Liner Unit. If not pre-heating the hydraulic fluid, skip this section and proceed to section 3.3.



Remove the hydraulic tank from the machine per the manufacturer's recommendations.

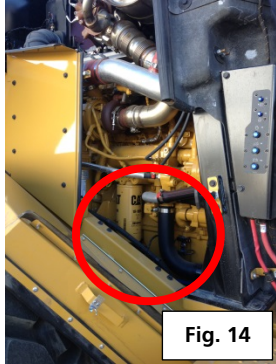
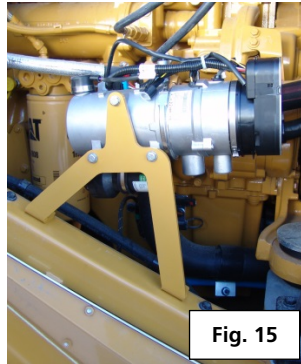
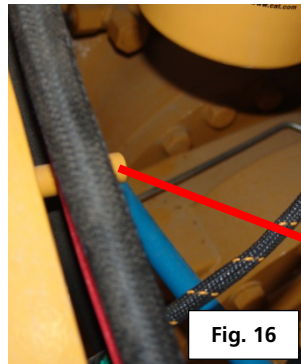
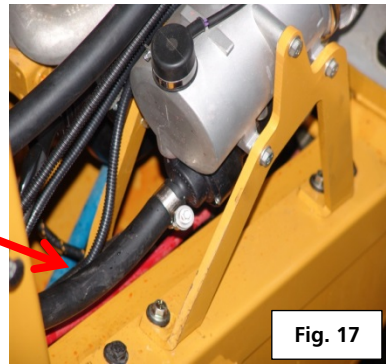
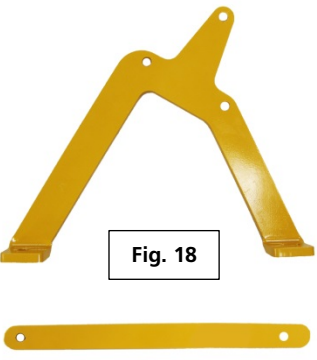
4. INSTALLATION

4.1. General References

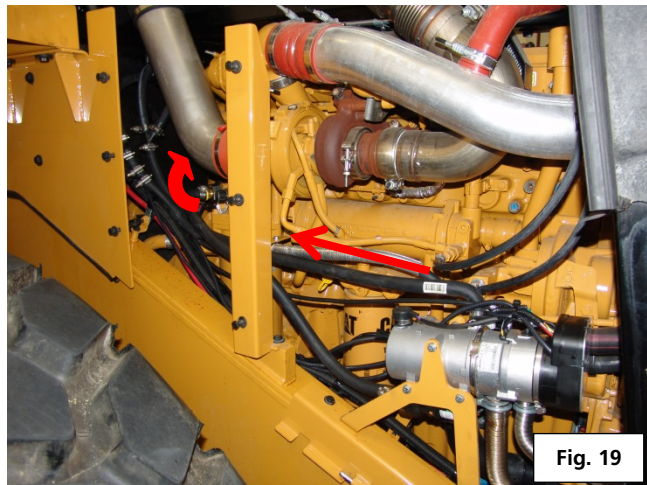
- Bare body parts, for example around any drilled holes must be treated with anti-corrosive coating.
- Secure hoses, cables and wiring harnesses with cable ties and clamps provided. Fit protective hoses around any chaffing points.

4.2. Heater

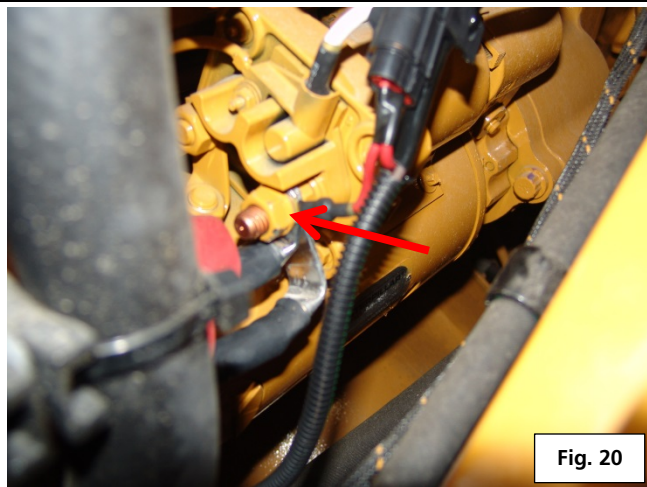
4.2.1. Mounting

Left Side Engine Access	Heater Mounting Location	Inner Frame Fixation Point	Both Brackets Installed
 <p data-bbox="347 890 422 915">Fig. 14</p>	 <p data-bbox="656 890 730 915">Fig. 15</p>	 <p data-bbox="964 890 1039 915">Fig. 16</p>	 <p data-bbox="1354 890 1429 915">Fig. 17</p>
 <p data-bbox="347 1192 422 1218">Fig. 18</p>		<p data-bbox="574 970 1438 1033">The heater is installed on the left side of the machine to the frame structure using existing mounting points as shown in figures 15-17.</p> <p data-bbox="574 1062 1438 1184">Remove the two existing O.E. bolts and mount large bracket to frame using item 5 of the Optional Add-on Accessories section on page 5. Use one of the previously removed O.E. bolts to affix the small bracket to inner frame shown in fig. 16-17.</p> <p data-bbox="574 1213 1438 1276">A mounting bracket must be fabricated by the installer. Refer to section 6 for mounting bracket example.</p>	

4.2.2. Electrical



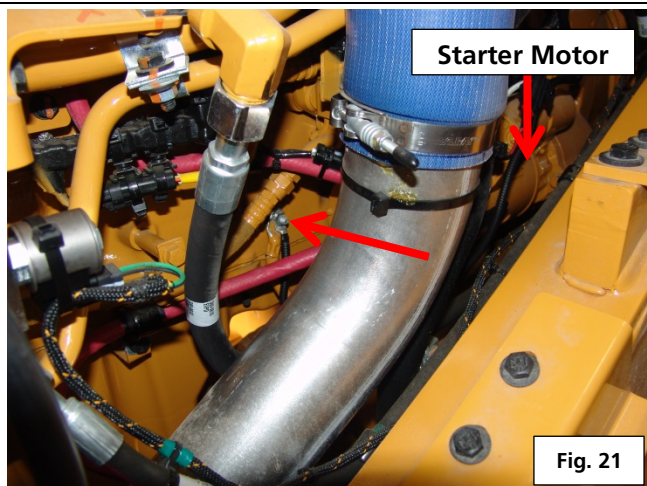
Route the Webasto power harness (Red and Brown 10 gauge wires) from the heater towards the front of the machine and around the back side of the engine.



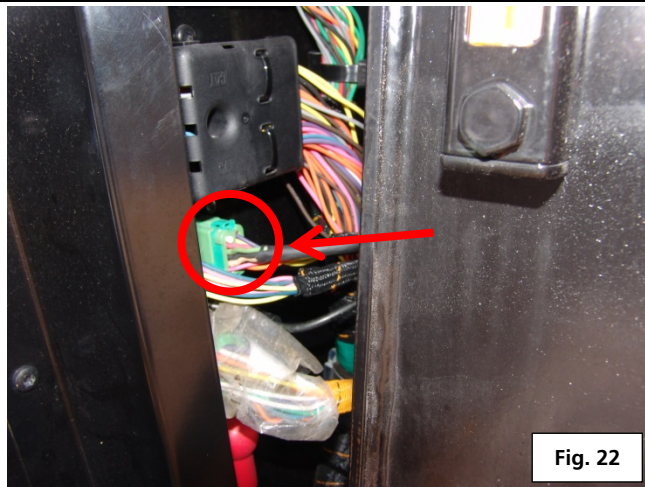
WARNING

Make sure to turn off master disconnect switch before performing this step!

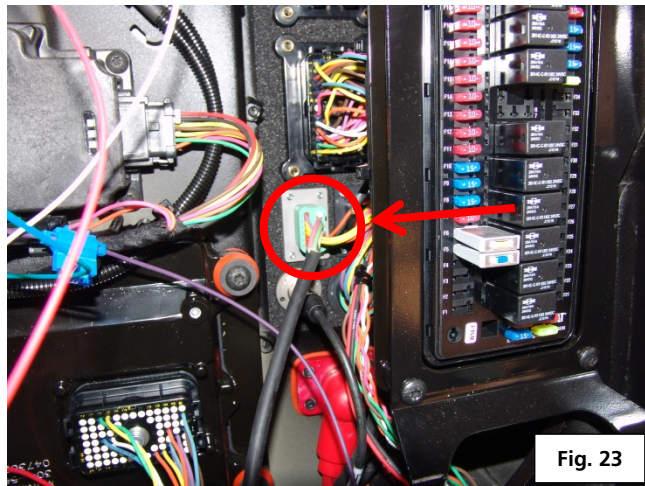
Locate the starter motor on the right side of the engine. Cut the positive lead of the Webasto heater harness to proper length, install supplied eyelet and connect to starter stud as shown in fig. 20.



Route the Webasto heater harness (Brown) ground wire to the engine ground stud as shown. Cut to length, install eyelet and connect to stud as shown in fig. 21.



To enter the cab with the Webasto controller harness; locate existing CAT connector in the back left corner of cab. Use the Deutsch terminals listed in the parts section to pin the 4 controller wires (white, green, black, and red) and insert into the 4 unused sockets of the connector. In this installation, pins 8-11 were empty.



Locate the same connector from the inside of the cab (left rear corner) and pin the remainder of the Webasto controller harness to match the wire colors from the previous step.

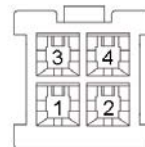


Mount the SmarTemp Control fx as shown in fig. 24.

Route controller harness to front right windshield pillar and connect using the pin-out chart below.

SmarTemp Connector Pin-out

Pin Number	Description	Wire Color
1	+12 / 24V	Red
2	GND	Brown
3	Heater ON/OFF Signal	Black or Gray
4	*Diagnostic Blink Code	Green

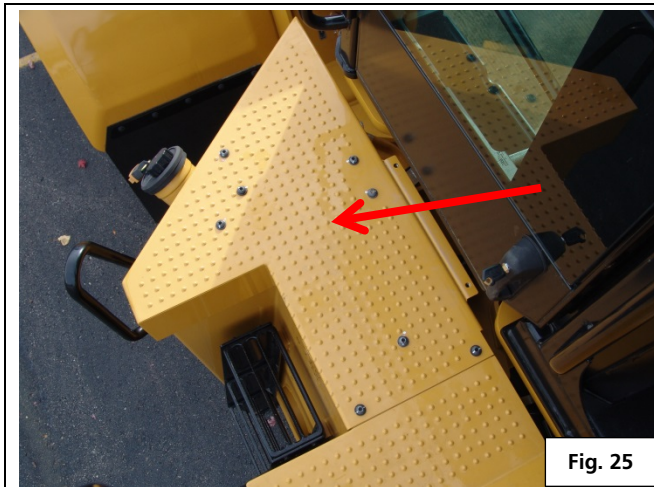


**TERMINAL INSERT
SIDE OF CONNECTOR**

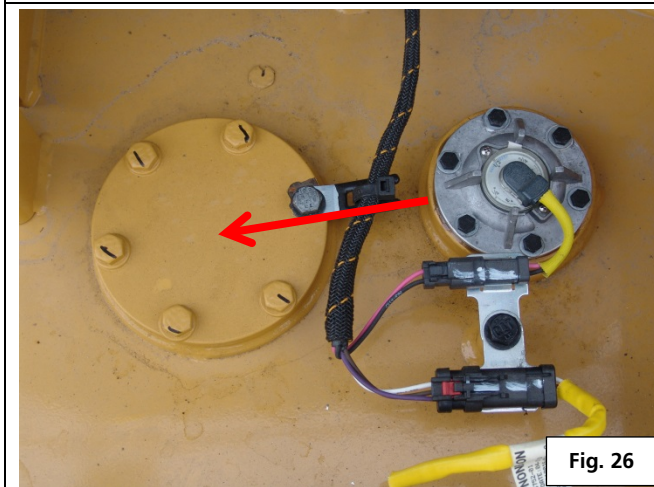
WARNING
This vehicle is equipped with a FUEL OPERATED HEATER that STARTS AUTOMATICALLY when the timer is set. Be sure the heater is turned OFF when this vehicle is in ENCLOSED SPACES and during RE-FUELING. Failure to do so could result in serious or fatal injury.

IMPORTANT
Make sure to position the Warning sticker near the SmarTemp Control fx.

4.2.3. Fuel



Remove the left side step panel per manufacturer's recommendations to access the top of the fuel tank.

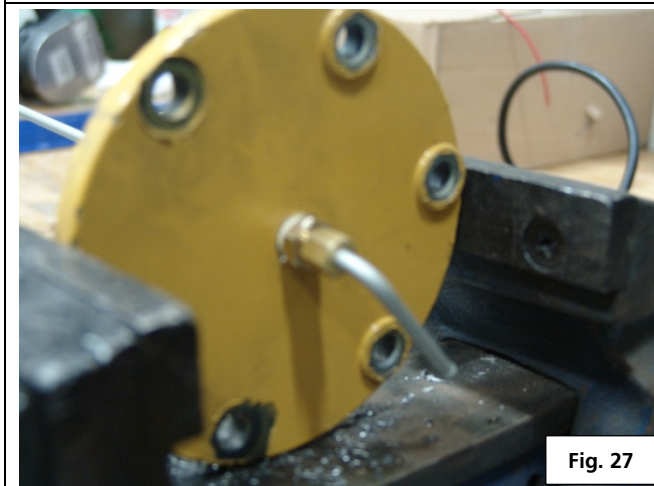


Thoroughly clean all debris around fuel tank access cover.

Remove for fuel standpipe installation in proceeding steps.

NOTE

There is an O-ring seal between the access cover and the fuel tank. If the access cover is carefully removed and the seal remains tacked to the cover, it's possible to reuse the seal. If this O-ring seal becomes damaged or warped in any way it must be replaced.



- Secure fuel tank access cover using a vice or comparable tool.
- Locate the center of the access cover and drill and tap using a 3/8" drill bit and 1/4-18 pipe tap.

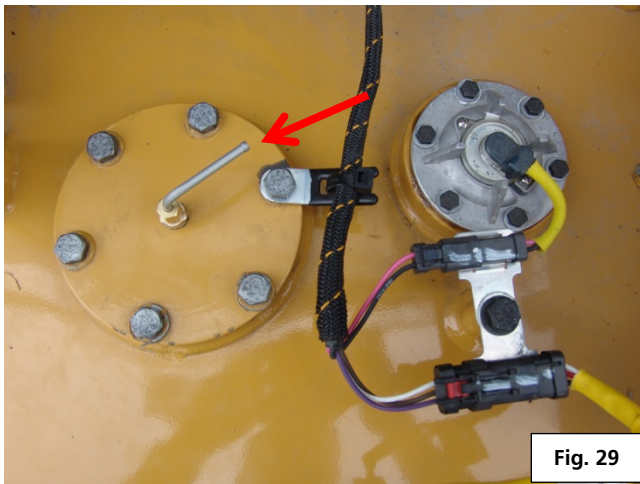
IMPORTANT

Make sure the tapered (Pipe) tap is used when tapping this hole as a standard tap will not allow for a fuel tight fit.

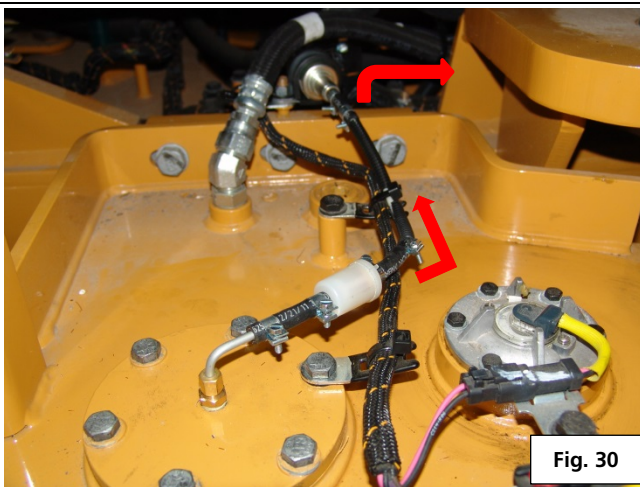
- Use pipe dope or thread tape when tightening the standpipe into place.



In the CAT 980K installation no cutting of the standpipe was necessary. However; with different tank options always ensure the standpipe is approximately 4" from the bottom of the tank. This ensures the heater cannot run the tank empty of fuel and less chance of picking debris or sediment from the bottom of the tank.



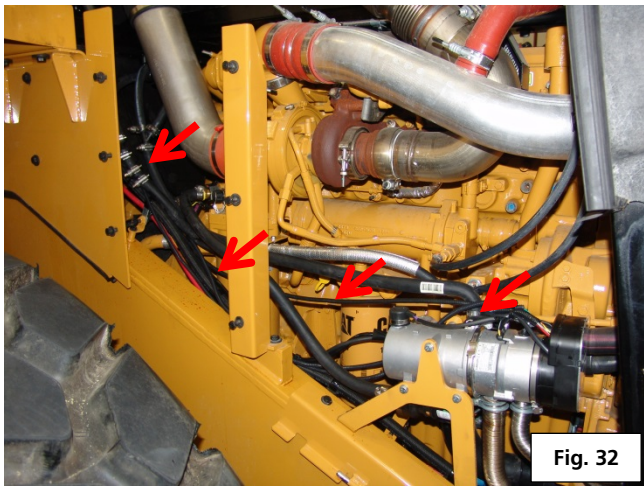
Reinstall the fuel tank access cover with the installed standpipe. Position the standpipe nipple as shown the fig. 29.



Install the supplied fuel filter, fuel pump, and fuel line as shown in figures. 30, 31 and 32 A P-clip is used to mount the fuel pump to an existing mounting stud.

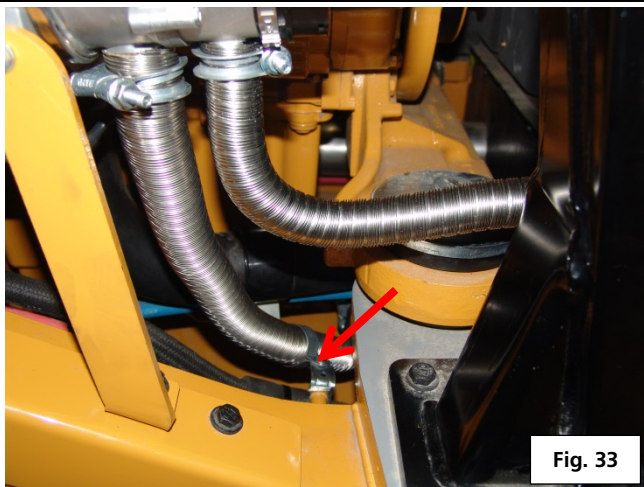


Note the direction of the fuel dampener towards the rear of the machine.



Install the supplied protective loom over the fuel line and route along the existing wires harnesses securing it with cable ties where necessary.

4.2.4. Exhaust



- Exhaust pipe from heater to muffler was cut to 29 1/2". Secure as shown ensuring it is clear of any heat sensitive materials. An exhaust clamp and small bracket were used to secure the exhaust pipe to the frame.

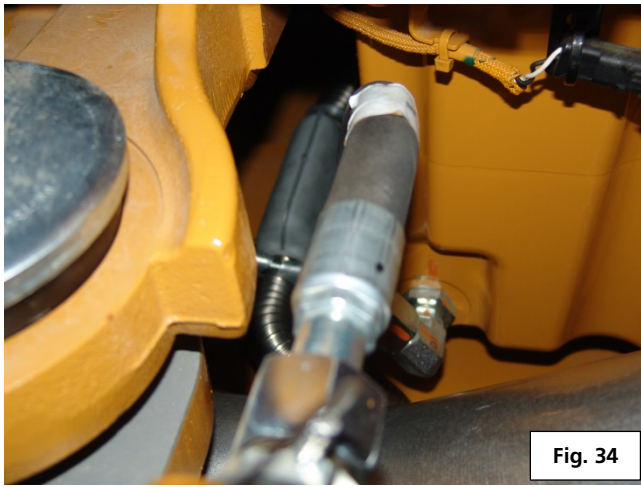


Fig. 34

For this installation the muffler was installed and mounted to the engine skid plate horizontally using an "L" bracket.

Note: When mounting a muffler horizontally, be sure the moisture weep hole (fig. 36) is clear of any obstructions.

- Mount muffler using a 1 ½" x 1 ½" L Bracket.

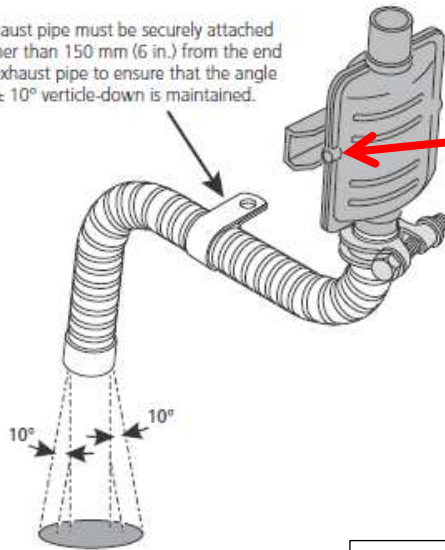


Fig. 35

- Drill a 2 ¼" hole through the skid plate to route the tailpipe.
- Cut tailpipe to 10 ½" and make a 90° bend to exit through the skid plate.

NOTE: If machine is not equipped with the skid plate, ensure to route the exhaust system using the illustration from figure 36.

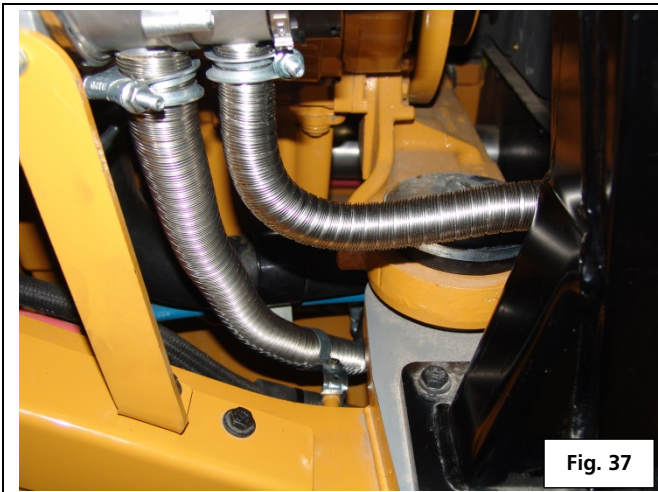
The exhaust pipe must be securely attached no further than 150 mm (6 in.) from the end of the exhaust pipe to ensure that the angle of 90° ± 10° verticle-down is maintained.



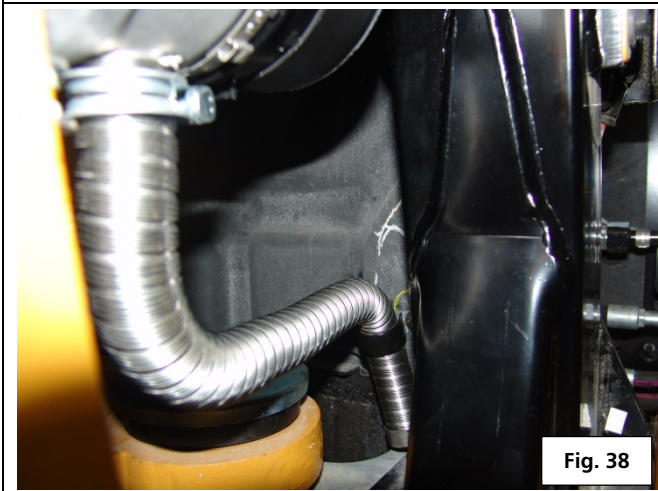
Discharge direction almost vertical 90° ± 10°

Fig. 36

4.2.5. Intake



The air intake is routed towards the rear of the machine and mounted as shown in figures 37 and 38.

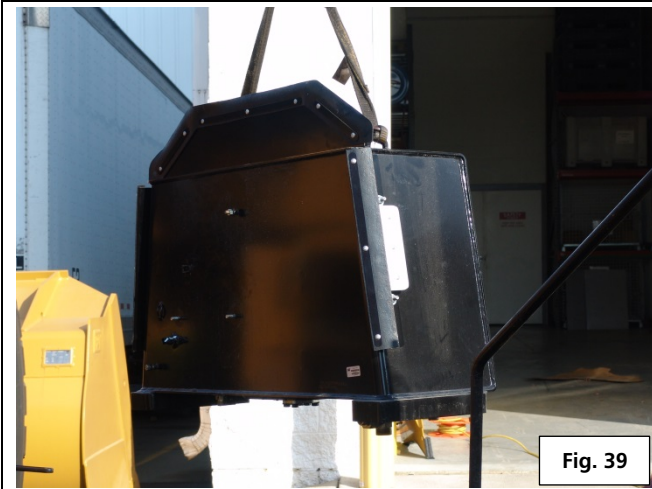


An intake tube clamp was used to secure tube to the rear engine shroud.

4.2.6. Coolant

Based on the variety of options available when an Off-Highway installation is performed, refer to the "Various Plumbing Configurations" section to determine the option that best fits your installation requirements.

4.3. Hydra liner (Hydraulic Fluid Warmer)



Remove The hydraulic tank per manufacturer's recommendations.



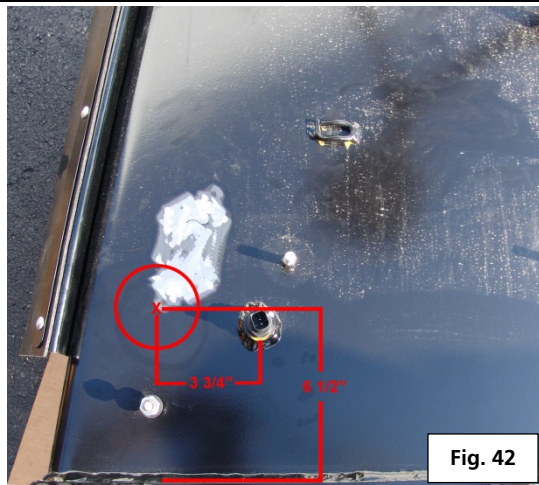
Locate the rearmost lower left corner of the hydraulic tank. Using the proper safety equipment, carefully remove the retaining bracket with a grinding wheel.



From the forward most side of the tank, remove the access cover.

IMPORTANT

Never re-use the access cover gasket. Be sure to have the correct gasket on hand when removing this access panel.



Using the dimensions in fig. 42, locate the center point and clearly mark.

Using the proper safety equipment, drill a 3" O.D. hole using a hole saw.



Install the coupler so that the Hydra Liner is a minimum of 1" from the opposite wall of the coupler installation. For example this installation required the coupler to be welded and gusseted with approximately a 1" lip on the outside of the tank. This maintained the proper 1" distance from the rear wall when the Hydra Liner was completely tightened into place.

IMPORTANT

Thoroughly clean all debris from the inside of the tank, install a new access cover gasket and reinstall the hydraulic tank.

4.4. Various Plumbing Configurations

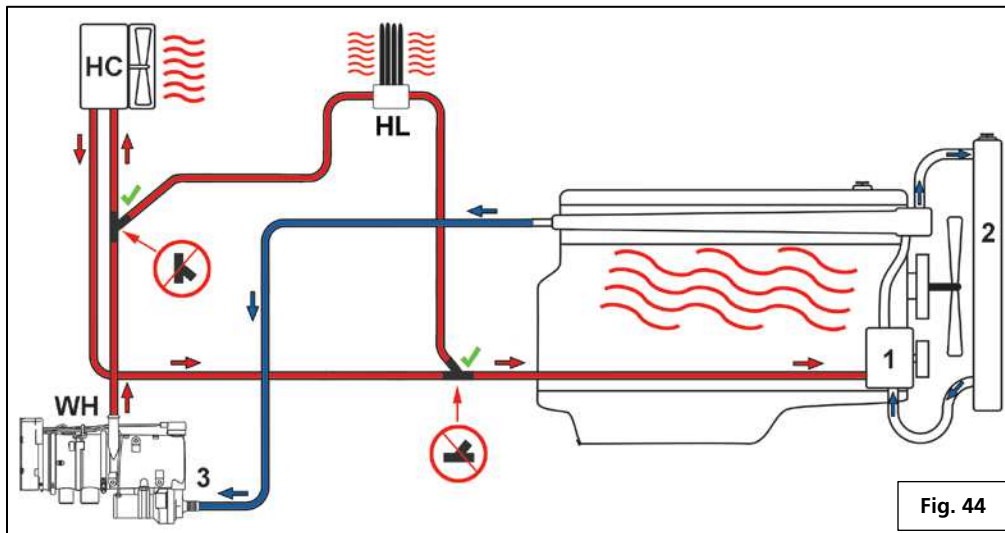
Coolant plumbing is dependent on the options that are installed. When routing always make sure to fully tighten all hose clamps and secure in a manner that's prevent hose chaffing.

CAUTION

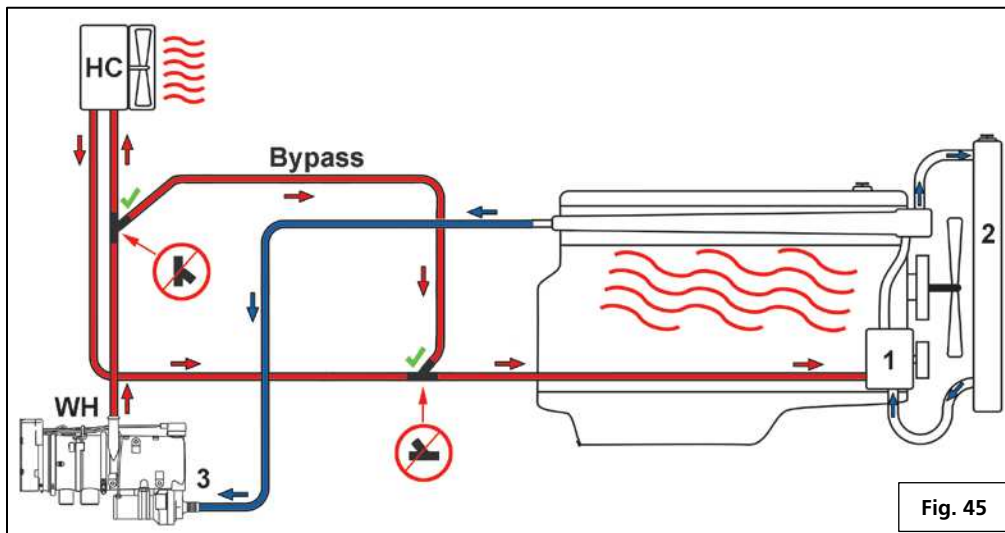
Never secure hoses to any moving parts!

Legend

Abbreviation	Description
HC	O.E. Heater Core (Heater Exchanger)
HL	Hydra Liner
WH	Webasto Heater
Bypass	Heater Core bypass when a Hydra Liner is not used.
1	O.E. Water Pump
2	Radiator
3	Webasto Water Pump



With Hydra Liner



Without Hydra Liner

5. INITIAL START-UP

IMPORTANT

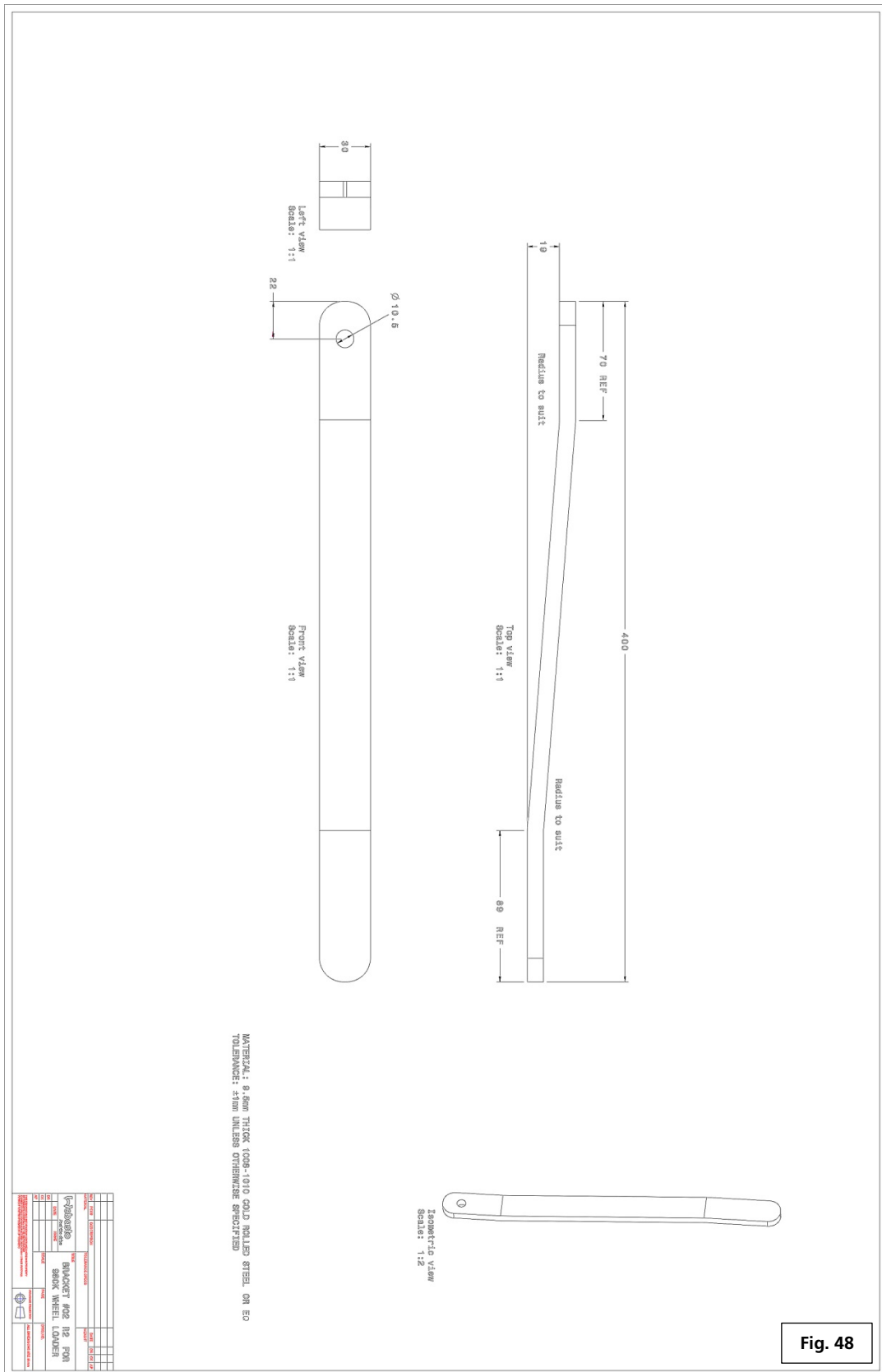
Refer to the safety instructions in the operating and maintenance instructions supplied with the heater kit. The operating and maintenance instructions must be read thoroughly before starting the heater.

After you have installed the heater, bleed the water system and the fuel supply system carefully. Follow the instructions supplied by the vehicle manufacturer for this purpose.

NOTE

As a result of the low fuel consumption the heater must be switched on several times to fill the fuel line and prime the system.

When starting the heater for the first time, make sure to check all the water and fuel connections for leaks and to ensure that they are secure. If the heater suffers a fault during operation, the fault must be located and remedied. Refer to the troubleshooting section in the Installation manual supplied with the heater kit for further diagnosis of faults.



7. LIMITED WARRANTY

Webasto warrants their heaters and heater kits against defects in material and workmanship for two (2) years or 2000 operating hours, effective at the time of installation or vehicle registration date for Original Equipment installations (OE). This warranty period may not exceed three (3) years from the original date of sale by Webasto. This warranty period may be superseded by a contractual agreement.

Limitations:

Webasto specifically excludes and limits warranty from the following:

- Damage to product in transit. All claims must be filed with carrier.
- Improper installation, which is not in accordance with valid, supplied installation instructions.
- Deterioration due to normal wear, corrosion, abuse, damage, accident, improper storage or operation.
- Modification of product by alteration, use of non-genuine parts or repair by unauthorized personnel.
- Economic loss for expenses related to travel, vehicle disability, personal injury or other incidental or consequential damages arising from any breach of this expressed warranty.

Owner's Responsibilities:

- Improper or incorrectly performed maintenance or repair voids this warranty.
- A Warranty Registration Card is included with the sale of each system. It is the owner's responsibility to complete this card and return it to Webasto for registration. The owner may also complete product registration by visiting <http://www.techwebasto.com>.

THIS WARRANTY IS NON-TRANSFERABLE.

IMPLIED WARRANTIES INCLUDING THAT OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY. WEBASTO DISCLAIMS ANY LIABILITY FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THE LIMITATION AND EXCLUSIONS VARY AMONG STATES AND CANADIAN PROVINCES AND MAY NOT APPLY TO YOU. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY AMONG STATES AND CANADIAN PROVINCES.

Information concerning all warranties may be obtained by calling (800) 860-7866.

NOTES

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NOTES



Feel the Drive

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